

# APPLYING TERM CONSISTENCY TO AN INEQUALITY CONSTRAINED INTERVAL GLOBAL OPTIMIZATION PROBLEM

## ABSTRACT

One embodiment of the present invention provides a system that solves a global optimization problem specified by a function  $f$  and a set of inequality constraints  $p_i(\mathbf{x}) \leq 0$  ( $i=1, \dots, m$ ), wherein  $f$  and  $p_i$  are scalar functions of a vector  $\mathbf{x} = (x_1, x_2, x_3, \dots, x_n)$ . The system operates by receiving a representation of the function  $f$  and the set of inequality constraints, and then storing the representation in a memory within the computer system. Next, the system performs an interval inequality constrained global optimization process to compute guaranteed bounds on the minimum value of the function  $f(\mathbf{x})$  subject to the set of inequality constraints. While performing the interval global optimization process, the system applies term consistency at various places in the process over a subbox  $\mathbf{X}$ , and excludes any portion of the subbox  $\mathbf{X}$  that violates term consistency.